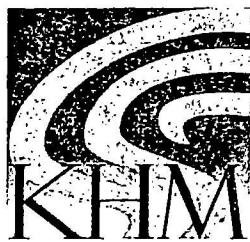


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October 29, 2002

DEQ No.: WPMVC-WMCVC-NWR-00-17

Project No.: B30-01G

Mr. Don Pettit  
Oregon Department of Environmental Quality  
2020 SW Fourth Avenue, Suite 400  
Portland, Oregon 97201

**Re: Groundwater Monitoring Report**

**Second Quarter 2002**  
**Linnton Facility**

USEPA SF  
  
1288989

Dear Mr. Pettit:

KHM Environmental Management, Inc. (KHM) has prepared this groundwater monitoring report for the Linnton Facility located at 11400 NW St Helens Road in Portland, Oregon (Figure 1). On April 24, 2002, 23 groundwater monitoring wells and piezometers were monitored, and 14 wells were sampled by KHM on behalf of Kinder Morgan Liquid Terminals, LLC (Kinder Morgan). The approximate site boundaries, site structures, and the approximate locations of the monitoring wells are presented in Figure 2. Quarterly groundwater monitoring is being currently conducted at the site in accordance with the Remedial Investigation (RI) Work Plan dated February 2002. Field procedures were performed in accordance with KHM's standard operating procedures for quality assurance and quality control.

Groundwater monitoring field activities conducted on April 24 and 25, 2002 consisted of measuring parameters from Wells MW-1 through MW-18 and P-1 through P-5 and collecting groundwater samples from monitoring Wells MW-4 through MW-18. The parameters measured in the wells consisted of water level measurements, pH, dissolved oxygen (DO), specific conductance, and temperature. The static water levels were measured in Wells MW-1 through MW-18 and P-1 through P-5 on April 24, 2002. Water level measurements were obtained by slowly lowering an electronic water level indicator into the well until the instrument indicated that the groundwater surface had been encountered. The measurement was made from a location permanently marked on the top of the casing to within the nearest 0.01 foot. If separate-phase hydrocarbons (SPH) were present in any of the monitoring wells, the thickness of the layer was measured and recorded. Each water level measurement was repeated at least once to verify the accuracy of the initial measurement. All measurements were recorded on field sampling forms (Attachment A). Prior to collecting groundwater samples, each monitoring well was

purged of at least three casing volumes of water. All fourteen wells were purged using clean, disposable bailers and new nylon cord. Prior to sampling, the wells were allowed to recover to approximately 80% or more of static water level. A total volume of approximately 90 gallons of water were purged from the wells. The purge water generated during this monitoring event was transported to Oil Re-refining of Portland, Oregon for recycling at their facility.

After purging each monitoring well, groundwater samples were collected using new disposable bailers. The water samples were placed in laboratory-prepared containers provided by North Creek Analytical (NCA) of Beaverton, Oregon. Each sample was appropriately labeled so as to identify the sample number, project name, facility number, the date and time of sample collection, and the sampler's name. Each sample was immediately placed in a chilled cooler for storage, and samples were transported to the laboratory using strict chain-of-custody protocols.

The groundwater samples were submitted to NCA on April 26, 2002. The water samples were analyzed for gasoline range hydrocarbons by NW TPH-Gx Methods, diesel and heavy oil range hydrocarbons by NW TPH-Dx Methods, benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270M-SIM, and total metals by EPA 6000/7000 Series Methods.

Based on the groundwater level measurements taken during this monitoring event, the groundwater flow direction appears to be generally to the east-northeast, toward the Willamette River. The groundwater flow direction is consistent with those of past monitoring events. Figure 2 illustrates the current approximate water level elevation contours and gradient.

Depth to groundwater in the measured wells ranged from 21.76 feet below top of casing in monitoring Well MW-5 to 11.04 feet below top of casing in monitoring Well MW-16. SPH were detected in six of the monitoring Wells, MW-1, MW-2, MW-3, MW-11, P-4, and P-5. The current and historical groundwater elevation data have been summarized in Table 1.

Benzene was detected above the laboratory MRL in seven wells at concentrations ranging from 2.85 micrograms per liter ( $\mu\text{g}/\text{L}$ ) in Well MW-8 to 312  $\mu\text{g}/\text{L}$  in Well MW-9. Concentrations found in the other monitoring wells are relatively consistent with the past monitoring events.

Based on a review of the laboratory reports, it appears that the submitted water samples were analyzed within the specified holding times, and that the appropriate quality assurance/quality control (QA/QC) procedures were followed during analysis. A summary of the laboratory analytical results is presented in Tables 2, 3, and 4. A complete

copy of the laboratory report and chain-of-custody documentation is included in Attachment B.

Groundwater will continue to be monitored on a quarterly basis. The next sampling event will be conducted during the third quarter 2002.

Please contact Mr. Kline at (503) 639-8098 if you have any questions regarding this report or any other aspect of this project.

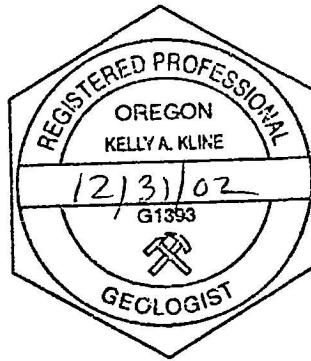
Sincerely,

**KHM Environmental Management, Inc.**

Ruth K. Ha, E.I.T.  
Project Engineer



Kelly A. Kline, R.G.  
Senior Geologist



Attachments: Table 1 – Groundwater Elevation and SPH Data  
Table 2 –Groundwater Sample Analytical Results- TPH, BTEX-N  
Table 3 –Groundwater Sample Analytical Results- PAHs  
Table 4 –Groundwater Sample Analytical Results- Metals  
Figure 1 – Site Location Map  
Figure 2 - Groundwater Elevation Contours and SPH Thickness

Attachment A - Field Forms

Attachment B - Certified Analytical Reports and Chain-of-Custody Documentation

cc: Mr. Steve Osborn, Kinder Morgan Energy Partners  
Mr. Eric Conard, Kinder Morgan Energy Partners  
Ms. Jeni Crawley, Kinder Morgan Energy Partners

**ATTACHMENT A**

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**FIELD FORMS**

**ATTACHMENT B**

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**CERTIFIED ANALYTICAL REPORTS AND CHAIN OF  
CUSTODY DOCUMENTATION**

**TABLE 1**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
**Kinder Morgan Liquid Terminals**  
**Linniton Terminal**  
**Portland, Oregon**

Well Identification (TOC)	Date Gauged	Depth to Water	Depth to SPH	SPH Thickness	TOC Elevation	Groundwater Elevation <sup>1</sup>	Cumulative SPH Recovered
		(ft)	(ft)	(ft)	(ft)	(ft)	(gallons)
MW-1 (27.98)	02/01/02	13.34	13.34	sheen	27.98	14.64	-
	04/24/02	13.26	13.26	sheen	27.98	14.72	-
MW-2 (28.47)	01/29/02	14.27	13.60	0.67	28.47	14.74	-
	04/24/02	13.96	13.37	0.59	28.47	14.98	2.25
MW-3 (28.97)	01/29/02	13.04	12.86	0.18	28.97	16.07	-
	04/24/02	13.11	13.00	-	28.97	15.86	0.40
MW-4 (32.88)	02/01/02	17.74	NP	-	32.88	15.14	-
	04/24/02	17.49	NP	-	32.88	15.39	-
MW-5 (40.08)	01/31/02	21.73	NP	-	40.08	18.35	-
	04/24/02	21.76	NP	-	40.08	18.32	-
MW-6 (36.93)	02/01/02	16.77	NP	-	36.93	20.16	-
	04/24/02	17.82	NP	-	36.93	19.11	-
MW-7 (32.26)	01/31/02	17.74	NP	-	32.26	14.52	-
	04/24/02	17.81	NP	-	32.26	14.45	-
MW-8 (30.06)	02/01/02	17.01	NP	-	30.06	13.05	-
	04/24/02	16.58	NP	-	30.06	13.48	-
MW-9 (30.45)	02/01/02	15.25	NP	-	30.45	15.20	-
	04/24/02	15.49	NP	-	30.45	14.96	-
MW-10 (30.32)	02/01/02	11.84	NP	-	30.32	18.48	-
	04/24/02	14.00	NP	-	30.32	16.32	-
MW-11 (35.03)	01/29/02	19.06	NP	-	35.03	15.97	-
	04/24/02	18.91	18.48	0.43	35.03	16.46	0.22
MW-12 (34.03)	01/31/02	14.85	NP	-	34.03	19.18	-
	04/24/02	15.32	NP	-	34.03	18.71	-
MW-13 (35.81)	01/31/02	17.67	NP	-	35.81	18.14	-
	04/24/02	18.35	NP	-	35.81	17.46	-
MW-14 (36.54)	01/31/02	17.71	NP	-	36.54	18.83	-
	04/24/02	18.42	NP	-	36.54	18.12	-
MW-15 (37.15)	01/31/02	15.12	NP	-	37.15	22.03	-
	04/24/02	16.13	NP	-	37.15	21.02	-
MW-16 (38.95)	01/31/02	8.91	NP	-	38.95	30.04	-
	04/24/02	11.04	NP	-	38.95	27.91	-

**TABLE 1**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
**Kinder Morgan Liquid Terminals**  
**Linniton Terminal**  
**Portland, Oregon**

Well Identification (TOC)	Date Gauged	Depth to Water	Depth to SPH	SPH Thickness	TOC Elevation	Groundwater Elevation <sup>1</sup>	Cumulative SPH Recovered
		(ft)	(ft)	(ft)	(ft)	(ft)	(gallons)
MW-1 (27.98)	02/01/02	13.34	13.34	sheen	27.98	14.64	-
	04/24/02	13.26	13.26	sheen	27.98	14.72	-
MW-2 (28.47)	01/29/02	14.27	13.60	0.67	28.47	14.74	-
	04/24/02	13.96	13.37	0.59	28.47	14.98	2.25
MW-3 (28.97)	01/29/02	13.04	12.86	0.18	28.97	16.07	-
	04/24/02	13.11	13.00	-	28.97	15.86	0.40
MW-4 (32.88)	02/01/02	17.74	NP	-	32.88	15.14	-
	04/24/02	17.49	NP	-	32.88	15.39	-
MW-5 (40.08)	01/31/02	21.73	NP	-	40.08	18.35	-
	04/24/02	21.76	NP	-	40.08	18.32	-
MW-6 (36.93)	02/01/02	16.77	NP	-	36.93	20.16	-
	04/24/02	17.82	NP	-	36.93	19.11	-
MW-7 (32.26)	01/31/02	17.74	NP	-	32.26	14.52	-
	04/24/02	17.81	NP	-	32.26	14.45	-
MW-8 (30.06)	02/01/02	17.01	NP	-	30.06	13.05	-
	04/24/02	16.58	NP	-	30.06	13.48	-
MW-9 (30.45)	02/01/02	15.25	NP	-	30.45	15.20	-
	04/24/02	15.49	NP	-	30.45	14.96	-
MW-10 (30.32)	02/01/02	11.84	NP	-	30.32	18.48	-
	04/24/02	14.00	NP	-	30.32	16.32	-
MW-11 (35.03)	01/29/02	19.06	NP	-	35.03	15.97	-
	04/24/02	18.91	18.48	0.43	35.03	16.46	0.22
MW-12 (34.03)	01/31/02	14.85	NP	-	34.03	19.18	-
	04/24/02	15.32	NP	-	34.03	18.71	-
MW-13 (35.81)	01/31/02	17.67	NP	-	35.81	18.14	-
	04/24/02	18.35	NP	-	35.81	17.46	-
MW-14 (36.54)	01/31/02	17.71	NP	-	36.54	18.83	-
	04/24/02	18.42	NP	-	36.54	18.12	-
MW-15 (37.15)	01/31/02	15.12	NP	-	37.15	22.03	-
	04/24/02	16.13	NP	-	37.15	21.02	-
MW-16 (38.95)	01/31/02	8.91	NP	-	38.95	30.04	-
	04/24/02	11.04	NP	-	38.95	27.91	-

**TABLE 1**  
**GROUNDWATER ELEVATION AND SPH RECOVERY DATA**  
**Kinder Morgan Liquid Terminals**  
**Linniton Terminal**  
**Portland, Oregon**

MW-17 (36.57)	01/31/02 04/24/02	16.93 17.83	NP NP	- -	36.57 36.57	19.64 18.74	- -
MW-18 (36.66)	04/24/02	19.41	NP	-	36.66	17.25	-
P-1 (37.89)	01/31/02 04/24/02	- 19.31	NP NP	- -	37.89 37.89	- 18.58	- -
P-2 (36.54)	01/31/02 04/24/02	- 13.99	NP NP	- -	36.54 36.54	- 22.55	- -
P-3 (33.53)	01/29/02 04/24/02	16.93 17.58	NP NP	- -	33.53 33.53	16.60 15.95	- -
P-4 (31.75)	01/29/02 04/24/02	16.60 15.91	NP NP	- -	31.75 31.75	15.15 15.84	- -
P-5 (29.75)	01/29/02 04/24/02	14.41 14.40	NP NP	- -	29.75 29.75	15.34 15.35	- -

**NOTES:**

NP = No Measurable Product

<sup>1</sup> = Elevation relative to 1988 North American Vertical Datum (NAVD)

- = Not measured, not analyzed, not sampled or not applicable

Groundwater elevations corrected for product thickness using formula:  

$$GWE = TOC - DTW - (0.8 \times (DTW - DTP))$$
 where 0.8 is the density of the SPH

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - TPH BTEX**  
 Kinder Morgan Liquid Terminals  
 Linnton Terminal  
 Portland, Oregon

Sample ID	Sample Date	Benzene ( $\mu\text{g/L}$ )	Ethyl-benzene ( $\mu\text{g/L}$ )	Gasoline ( $\mu\text{g/L}$ )	Naphthalene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Xylene (total) ( $\mu\text{g/L}$ )	Diesel ( $\mu\text{g/L}$ )	Heavy Oil ( $\mu\text{g/L}$ )
MW-1	02/01/02	2.50 U	2.50 U	2610	31.5	2.50 U	5.00 U	NA	NA
MW-4	02/01/02	0.500 U	0.500 U	884	2.00 U	0.500 U	1.00 M	NA	NA
	05/01/02	2.50 U	2.50 U	2610	31.5 J	2.50 U	5.00 U	NA	NA
MW-5	02/01/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA
	04/24/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 M	250 U	500 U
MW-6	02/01/02	30.6	12.4	2270	2.00 U	12	11.3	NA	NA
	04/24/02	37.1	6.03	2140	2.00 U	6.34	8.45	250 U	500 U
MW-7	01/31/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA
	04/24/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	250 U	500 U
MW-8	02/01/02	10.8	22.3	2350	4.92	10	8.31	NA	NA
	04/25/02	2.85	13.4	1190	7.64	4.45	4.52	250 U	500 U
MW-9	02/01/02	357	2.50 M	1730	10.0 U	4.48	5.00 M	NA	NA
	04/25/02	312	5.47	1360	10.0 U	6.84	9.44	250 U	500 U
MW-10	02/01/02	15.5	6.97	3590	10.0 M	7.7	5.89	NA	NA
	04/25/02	16.7	7.65	4470	4.00 U	8.48	9.13	3850	500 U
MW-10 DUP	02/01/02	18	7.83	4010	10.0 U	8.7	6.7	NA	NA
MW-12	01/31/02	0.500 U	0.500 U	1320	2.00 U	0.500 U	1.00 U	NA	NA
	04/25/02	1.00 U	1.00 U	1970	4.00 U	1.00 U	2.00 U	4030	500 U
MW-13	01/31/02	109	8.9	6150	10.0 U	6.74	5.00 M	NA	NA
	04/25/02	48.5	9.14	5700	10.0 U	7.56	5.00 U	250 U	500 U
MW-13 DUP	01/31/02	102	8.7	6110	10.0 U	6.86	5.00 M	NA	NA
	04/25/02	51.8	8.76	5720	10.0 U	8.62	5.00 U	250 U	500 U
MW-14	01/31/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA
	04/24/02	0.500 U	0.500 U	80.0 M	2.00 U	0.500 U	1.00 U	250 U	500 U
MW-15	01/31/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA
	04/24/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	250 U	500 U
MW-16	02/01/02	49.1	4.42	3620	10.0 M	12.6	7.61	NA	NA
	04/25/02	46	2.50 U	3570	10.0 U	14	8.73	4040	1050
MW-17	01/31/02	0.500 U	0.500 U	93.8	2.00 U	0.500 U	1.00 U	NA	NA
	04/24/02	0.500 U	0.500 U	126	2.00 M	0.500 U	1.00 M	360	500 U
MW-18	04/25/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	250 U	500 U

**TABLE 2**  
**GROUNDWATER ANALYTICAL RESULTS - TPH BTEX**  
 Kinder Morgan Liquid Terminals  
 Linnton Terminal  
 Portland, Oregon

Sample ID	Sample Date	Benzene (µg/L)	Ethyl- benzene (µg/L)	Gasoline (µg/L)	Naph- thalene (µg/L)	Toluene (µg/L)	Xylene (total) (µg/L)	Diesel (µg/L)	Heavy Oil (µg/L)
MW-18 DUP	04/25/02	0.500 U	0.500 U	80.0 M	2.00 U	0.500 U	1.00 U	250 U	500 U
Trip Blank	04/24/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA
	04/25/02	0.500 U	0.500 U	80.0 U	2.00 U	0.500 U	1.00 U	NA	NA

**NOTES:**  
 Gasoline Range Hydrocarbons analyzed by NW TPH-Gx Method  
 Diesel and Heavy Oil Range Hydrocarbons analyzed by NW TPH-DX Method  
 Benzene, Toluene, Ethylbenzene, Xylene, and Naphthalene (BTEX/N) analyzed by USEPA Method 8021B  
 µg/l = micrograms per liter  
 Lab reported Diesel and Heavy Oil in mg/l  
 NA = Not Analyzed  
 J = Estimated Value  
 U = Analyte included in the analysis but not detected above laboratory method detection limits (MDLs)  
 M = Analyte included in the analysis but not detected above laboratory method reporting limits (MRLs)  
**Bold Face Font** = Analyte detected above the MRLs

**TABLE 3**  
**GROUNDWATER ANALYTICAL PAH's**  
**Kinder Morgan Liquid Terminals**  
**Linnton Terminal**  
**Portland, Oregon**

Sample ID	Sample Date	Acenaphthene ( $\mu\text{g/L}$ )	Acenaphthylene ( $\mu\text{g/L}$ )	Anthracene ( $\mu\text{g/L}$ )	Benzo(a)anthracene ( $\mu\text{g/L}$ )	Benzo(a)pyrene ( $\mu\text{g/L}$ )	Benzo(b)fluoranthene ( $\mu\text{g/L}$ )	Benzo(ghi)perylene ( $\mu\text{g/L}$ )	Benzo(k)fluoranthene ( $\mu\text{g/L}$ )	Chrysene ( $\mu\text{g/L}$ )	Dibenzo(a,h)anthracene ( $\mu\text{g/L}$ )	Fluoranthene ( $\mu\text{g/L}$ )	Fluorene ( $\mu\text{g/L}$ )	Indeno(1,2,3-cd)pyrene ( $\mu\text{g/L}$ )	Naphthalene ( $\mu\text{g/L}$ )	Phenanthrene ( $\mu\text{g/L}$ )	Pyrene ( $\mu\text{g/L}$ )
MW-1	02/01/02	5.00 U	2.50 U	<b>2.74</b>	0.500 U	0.500 U	0.500 U	0.500 U	0.500 M	1.00 U	0.500 U	<b>20.9</b>	0.500 U	12.5 U	13.3	2.23	
MW-4	02/01/02	0.500 U	0.100 U	<b>0.257</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>2.32</b>	0.100 U	1.00 U	<b>0.725</b>	0.17	
	04/25/02	0.500 U	0.100 U	<b>0.368</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>2.21</b>	0.100 U	0.500 U	<b>0.618</b>	0.192	
MW-5	02/01/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	
	04/24/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 M	0.100 U	0.100 U	
MW-6	02/01/02	<b>0.153</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>0.131</b>	0.100 U	5.00 U	<b>0.225</b>	0.100 U	
	04/24/02	<b>0.151</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>0.101</b>	0.100 U	2.00 U	<b>0.214</b>	0.100 U	
MW-7	01/31/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	
	04/24/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	
MW-8	02/01/02	<b>18.9</b>	2.00 U	<b>0.759</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	<b>1.03</b>	<b>12.4</b>	0.100 U	<b>2.56</b>	<b>11.2</b>	<b>1.19</b>	
	04/25/02	<b>40.5</b>	0.500 M	<b>0.606</b>	0.100 M	0.100 M	0.100 M	0.100 M	0.100 M	0.200 U	<b>1.69</b>	<b>18.6</b>	0.100 U	<b>8.36</b>	<b>7.73</b>	<b>1.72</b>	
MW-9	02/01/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.500 U	0.100 U	0.100 M	
	04/25/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	1.00 U	0.100 U	0.100 U	
MW-10	02/01/02	<b>7.81</b>	0.100 U	<b>0.304</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	<b>0.447</b>	<b>5.21</b>	0.100 U	<b>5.00 U</b>	<b>1.41</b>	<b>0.512</b>	
	04/25/02	<b>4.39</b>	0.100 U	<b>0.367</b>	<b>0.123</b>	<b>0.108</b>	0.100 M	0.100 M	0.100 M	0.200 U	<b>0.784</b>	<b>3.21</b>	0.100 M	2.50 U	<b>0.903</b>	<b>0.933</b>	
MW-10-Dup	02/01/02	<b>6.6</b>	0.500 U	<b>0.228</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	<b>0.387</b>	<b>4.19</b>	0.100 U	<b>5.00 U</b>	<b>0.557</b>	<b>0.451</b>	
MW-12	01/31/02	<b>2.05</b>	0.500 U	<b>0.212</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>4.34</b>	0.100 U	2.50 U	<b>4.11</b>	0.100 M	
	04/25/02	<b>1.52</b>	0.100 U	<b>0.349</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 M	<b>3.32</b>	0.100 U	1.00 U	<b>4.55</b>	<b>0.143</b>	
MW-13	01/31/02	<b>1.62</b>	0.100 U	<b>0.16</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 M	<b>3.23</b>	0.100 U	5.00 U	<b>2.61</b>	0.100 M	
	04/25/02	<b>1.25</b>	0.100 U	<b>0.203</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 M	<b>2.75</b>	0.100 U	2.00 U	<b>2.63</b>	0.100 M	
MW-13 Dup	01/31/02	<b>1.47</b>	0.100 U	<b>0.144</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 M	<b>3.26</b>	0.100 U	2.00 U	<b>3.3</b>	0.100 M	

TABLE 3  
GROUNDWATER ANALYTICAL PAH's  
Kinder Morgan Liquid Terminals  
Linnton Terminal  
Portland, Oregon

Sample ID	Sample Date	Acenaphthene ( $\mu\text{g/L}$ )	Acenaphthylene ( $\mu\text{g/L}$ )	Anthracene ( $\mu\text{g/L}$ )	Benz(a)anthracene ( $\mu\text{g/L}$ )	Benzo(a)pyrene ( $\mu\text{g/L}$ )	Benzo(b)fluoranthene ( $\mu\text{g/L}$ )	Benzo(ghi)perylene ( $\mu\text{g/L}$ )	Benzo(k)fluoranthene ( $\mu\text{g/L}$ )	Chrysene ( $\mu\text{g/L}$ )	Dibenzo(a,h)anthracene ( $\mu\text{g/L}$ )	Fluoranthene ( $\mu\text{g/L}$ )	Fluorene ( $\mu\text{g/L}$ )	Indeno(1,2,3-cd)pyrene ( $\mu\text{g/L}$ )	Naphthalene ( $\mu\text{g/L}$ )	Phenanthrene ( $\mu\text{g/L}$ )	Pyrene ( $\mu\text{g/L}$ )
	04/25/02	<b>1.36</b>	0.100 U	<b>0.138</b>	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 M	<b>2.73</b>	0.100 U	2.00 U	<b>2.74</b>	0.100 M	
MW-14	01/31/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 M	
	04/24/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
MW-15	01/31/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
	04/24/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
MW-16	02/01/02	<b>1.4</b>	0.200 U	0.200 M	0.200 M	0.200 M	0.200 U	0.200 U	0.200 M	0.400 U	<b>0.358</b>	<b>2.97</b>	0.200 U	4.00 U	<b>1.71</b>	0.342	
	04/25/02	<b>1.16</b>	0.100 U	<b>0.256</b>	<b>0.255</b>	<b>0.218</b>	<b>0.208</b>	<b>0.158</b>	<b>0.183</b>	<b>0.273</b>	0.200 U	<b>0.642</b>	<b>2.84</b>	0.138	1.50 U	<b>2.49</b>	0.626
MW-17	01/31/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	<b>0.214</b>	0.100 U	0.200 U	<b>0.301</b>	0.100 U	
	04/24/02	0.100 U	0.100 U	0.2100 M	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.187	0.100 U
MW-18	04/25/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U
MW-18 Dup	04/25/02	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.200 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U

**NOTES:**

Polynuclear Aromatic Compounds (PAHs) analyzed by USEPA Method 8270M-SIM

$\mu\text{g/L}$  = micrograms per liter

J = Estimated Value

U = Analyte included in the analysis but not detected above laboratory method detection limits (MDLs)

M = Analyte included in the analysis but not detected above laboratory method reporting limits (MRLs)

**Bold Face Font** = Analyte detected above the MRLs

**TABLE 4**  
**GROUNDWATER ANALYTICAL - TOTAL METALS**  
Kinder Morgan Liquid Terminals  
Linnton Terminal  
Portland, Oregon

Sample ID	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)	Zinc (mg/L)
MW-1	02/01/02	<b>0.0051</b>	<b>0.137J</b>	0.00100 U	0.0019	<b>0.0035</b>	0.00100 M	0.000200 U	0.00100 M	0.00100 U	<b>0.00863</b>
MW-4	02/01/02	<b>0.00554</b>	<b>0.0916</b>	0.00100 U	0.00100 M	<b>0.00248</b>	0.00100 M	0.000200 U	<b>0.00113</b>	0.00100 U	0.00500 M
	04/25/02	NA	NA	NA	NA	NA	0.00100 U	NA	NA	NA	NA
MW-5	02/01/02	<b>0.00342</b>	<b>0.14</b>	0.00100 M	<b>0.00611</b>	<b>0.0161</b>	<b>0.00809</b>	0.000200 U	0.00100 M	0.00100 U	<b>0.0356</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.00976</b>	NA	NA	NA	NA
MW-6	02/01/02	<b>0.0403</b>	<b>0.204</b>	<b>0.00189</b>	<b>0.00163</b>	<b>0.0069</b>	<b>0.00265</b>	0.000200 U	0.00100 M	0.00100 U	<b>0.0486</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.00143</b>	NA	NA	NA	NA
MW-7	01/31/02	<b>0.00339</b>	<b>0.0786</b>	0.00100 M	<b>0.00294</b>	<b>0.00673</b>	<b>0.00214</b>	0.000200 U	0.00100 M	0.00100 U	<b>0.014</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.0024</b>	NA	NA	NA	NA
MW-8	02/01/02	<b>0.00884</b>	<b>0.0396</b>	0.00100 M	0.00100 M	0.00100 M	<b>0.0116</b>	0.000200 U	0.00100 M	0.00100 U	0.00500 M
	04/25/02	NA	NA	NA	NA	NA	<b>0.00761</b>	NA	NA	NA	NA
MW-9	02/01/02	<b>0.0384</b>	<b>0.288</b>	0.00100 M	<b>0.0228</b>	<b>0.048</b>	<b>0.0239</b>	0.000200 U	<b>0.00133</b>	0.00100 M	<b>0.106</b>
	04/25/02	NA	NA	NA	NA	NA	<b>0.00102</b>	NA	NA	NA	NA
MW-10	02/01/02	<b>0.00576</b>	<b>0.0204</b>	0.00100 U	<b>0.00149</b>	0.00200 M	<b>0.00308</b>	0.000200 U	0.00100 M	0.00100 U	<b>0.00563</b>
	04/25/02	NA	NA	NA	NA	NA	<b>0.00648</b>	NA	NA	NA	NA
MW-10-Dup	02/01/02	<b>0.00465</b>	<b>0.0128</b>	0.00100 U	<b>0.00103</b>	0.00200 M	<b>0.00226</b>	0.000200 U	0.00100 U	0.00100 U	0.00500 M
MW-12	01/31/02	<b>0.0594</b>	<b>0.0804</b>	0.00100 U	<b>0.00138</b>	0.00200 M	<b>0.00175</b>	0.000200 U	0.00100 M	0.00100 U	0.00500 M
	04/25/02	NA	NA	NA	NA	NA	<b>0.00444</b>	NA	NA	NA	NA
MW-13	01/31/02	<b>0.0551</b>	<b>0.254</b>	0.00100 U	<b>0.0156</b>	0.0259	<b>0.0138</b>	0.000200 U	0.00100 M	0.00100 U	<b>0.0648</b>
	04/25/02	NA	NA	NA	NA	NA	<b>0.0109</b>	NA	NA	NA	NA
MW-13 Dup	01/31/02	<b>0.0543</b>	<b>0.266</b>	0.00100 U	<b>0.0177</b>	<b>0.0279</b>	<b>0.0145</b>	0.000200 U	0.00100 M	0.00100 M	<b>0.0764</b>
	04/25/02	NA	NA	NA	NA	NA	<b>0.015</b>	NA	NA	NA	NA

**TABLE 4**  
**GROUNDWATER ANALYTICAL - TOTAL METALS**  
 Kinder Morgan Liquid Terminals  
 Linnton Terminal  
 Portland, Oregon

Sample ID	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)	Zinc (mg/L)
MW-14	01/31/02	<b>0.0165</b>	<b>0.456</b>	0.00100 M	<b>0.0402</b>	<b>0.078</b>	<b>0.0332</b>	0.000200 U	0.00100 M	0.00100 M	<b>0.199</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.014</b>	NA	NA	NA	NA
MW-15	01/31/02	<b>0.00951</b>	<b>0.262</b>	0.00100 M	<b>0.0224</b>	<b>0.0355</b>	<b>0.0133</b>	0.000200 U	<b>0.0011</b>	0.00100 U	<b>0.0936</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.0754</b>	NA	NA	NA	NA
MW-16	02/01/02	<b>0.116</b>	<b>0.354</b>	0.00100 M	<b>0.0465</b>	<b>0.0508</b>	<b>0.0312</b>	0.000200 U	0.00100 M	0.00100 M	<b>0.144</b>
	04/25/02	NA	NA	NA	NA	NA	<b>0.00998</b>	NA	NA	NA	NA
MW-17	01/31/02	<b>0.00574</b>	<b>0.209</b>	0.00100 U	<b>0.00604</b>	<b>0.00954</b>	<b>0.00374</b>	0.000200 U	0.00100 U	0.00100 U	<b>0.0242</b>
	04/24/02	NA	NA	NA	NA	NA	<b>0.0106</b>	NA	NA	NA	NA
MW-18	04/25/02	NA	NA	NA	NA	NA	<b>0.0362</b>	NA	NA	NA	NA
MW-18 Dup	04/25/02	NA	NA	NA	NA	NA	<b>0.0294</b>	NA	NA	NA	NA

**NOTES:**

Total Metals analyzed by USEPA Method 6000/7000 Series Method

mg/l = Milligrams per liter

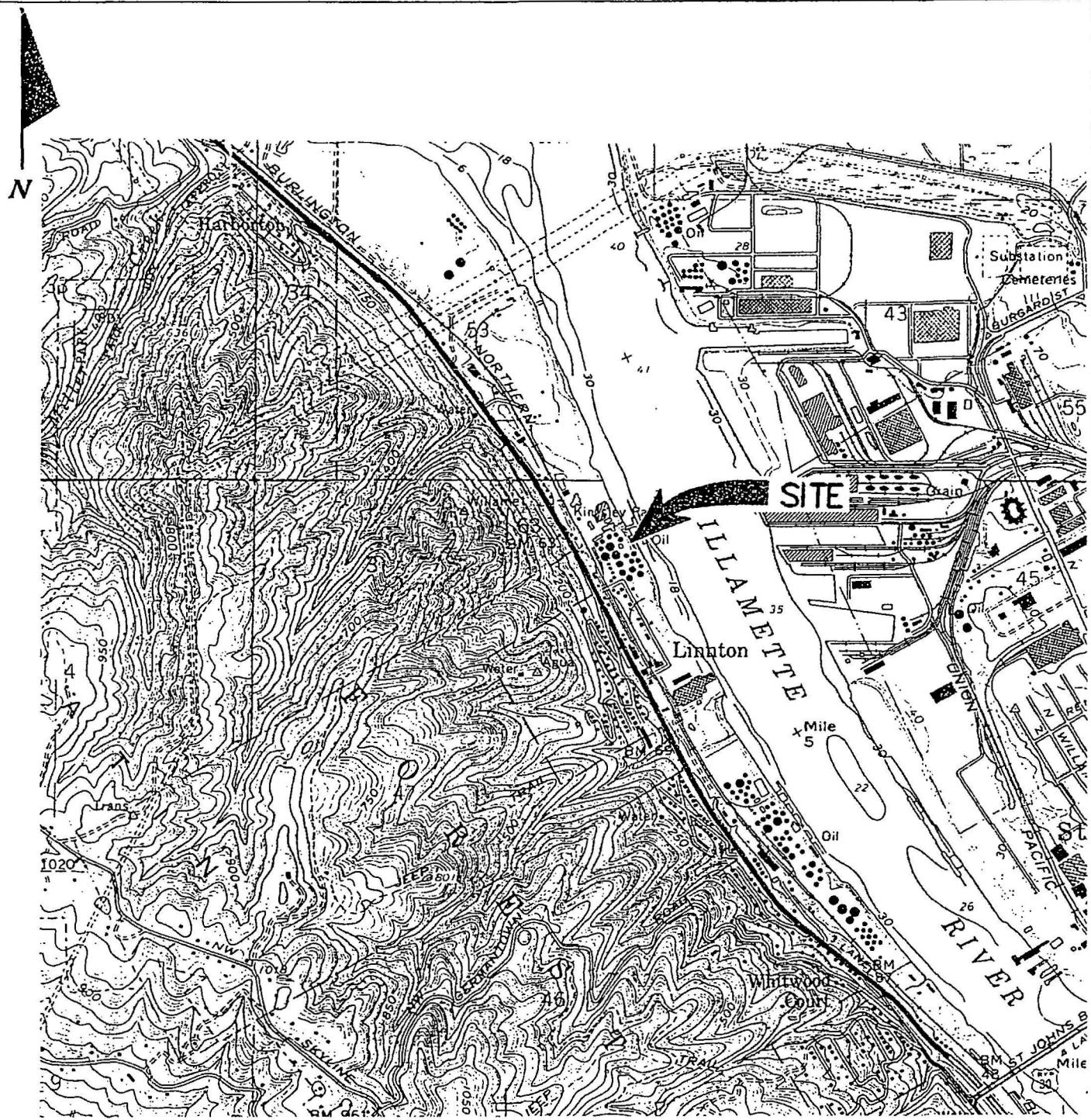
NA = Not Analyzed

J = Estimated Value

U = Analyte included in the analysis but not detected above laboratory method detection limits (MDLs)

M = Analyte included in the analysis but not detected above laboratory method reporting limits (MRLs)

**Bold Face Font** = Analyte detected above the MRLs



## REFERENCES

USGS 7.5 Minute Topographic Map  
Linnton, Oregon, 1961  
Photorevised 1984

SCALE: 1:25,000

<b>KHM</b> <small>ENVIRONMENTAL MANAGEMENT INC.</small>	<b>TITLE</b> <b>Site Location Map</b>	
	<b>Kinder Morgan Liquid Terminals, LLC</b> <b>Linnton Terminal</b> <b>11400 NW St. Helens Road</b> <b>Portland, Oregon</b>	
DATE 8/12/02	PROJECT B30-01G	FIGURE 1

